

The Role of a Biomechanics Expert in Personal Injury Litigation

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Accident incidents happen all the time, from slips, trips, and falls to motor vehicle collisions. The individuals involved may claim a host of injuries stemming directly from the incident. How does one determine whether claimed injuries are causally related to the event or not? Here we discuss how biomechanical engineering experts can shed light on injury causation and add value to personal injury litigation cases.

Biomechanics is a subset of Biomedical Engineering, the study and application of “traditional” engineering disciplines (e.g.: mechanical, chemical, electrical) to the human body. A Biomechanical Engineer, therefore, employs the fundamentals of mechanics and mechanical engineering to analyze and evaluate biological tissues and materials. Biomechanical Engineering experts are called upon when the mechanism of an injury is unknown or in dispute.

The role of a biomechanical engineer is distinct from that of a medical physician. In the context of litigation, a physician can address the accuracy of a diagnosis and appropriateness of prescribed treatments (i.e., standard of care). Biomechanical engineers, however, are concerned with *how* the diagnosed injury was caused, and determining if the *mechanism of the injury* is consistent with the manner of the incident.

Biomechanical engineers often work in parallel with other experts along the liability chain (standard of care, product defect, premises, etc.). The Biomechanics and Injury Causation experts of [Exigent’s Forensic Consulting Division](#) have performed biomechanical investigations and provided injury causation opinions in a variety of event scenarios, for both plaintiff and defense. The following illustrate a few examples.

Case Scenario Example #1. A patient at a medical facility suffers a fall while being assisted by a nurse. The patient claims his preexisting knee injury was exacerbated by the fall. The biomechanical engineer analyzes the medical records to provide the attorney with a clearer picture of the diagnosed injuries (e.g.: location and mechanisms of each injury, whether they are acute or chronic/degenerative in nature) and reconstructs the fall event to determine whether it generated the forces necessary to exacerbate the preexisting injury. Whether the nurse and the facility itself failed to meet the standards of care with respect to staffing, training, and procedures would be determined by our [Nursing and Healthcare experts](#).

Case Scenario Example #2. In the early morning hours, a vehicle veers out of its lane and collides into the driver's side of another vehicle traveling in the opposite . The operator of the struck vehicle claims she suffered a concussion as a result of the incident. A biomechanical investigation of this motor vehicle collision is conducted to determine whether the forces generated during the collision were sufficient to cause the individual's concussion, a mild traumatic brain injury (mTBI). The first question is what was the severity of the crash and what is the principle direction of force (PDOF)? Our injury causation experts work with experienced accident reconstructionists across the country, who are able to use the crash data, damage estimates, vehicle photographs, and other discovery to assist them in determining the physics of the crash, including the change in velocity (Δv), crash pulse, and PDOF. The biomechanical engineer uses this information to assist them in providing an opinion regarding the second question: was the severity of the crash sufficient to have caused the plaintiff's concussion?

An additional aspect of the case that can be explored is the actions of the operator of the striking vehicle. At Exigent, our human factors experts can determine if the driver was distracted or fatigued prior to the collision

Case Scenario Example #3. As a handcuffed individual is being put into a police car, he claims the officer purposefully slammed the top of his head into the door frame, causing a cervical vertebra fracture. The medical records including the injury pattern, and testimony or statements in the case can assist the biomechanical engineer in determining whether the officer's actions and force of those actions during this incident are consistent with the plaintiff's diagnosed injury. The officer's actions would subsequently be identified as reasonable or unreasonable in the handling of the plaintiff by Exigent's Police Practices experts utilizing their decades of experience and expertise.

In summary, biomechanical engineers utilize their experience, training, and expertise to provide value to your personal injury litigation matters by determining whether the injuries being claimed were causally related to the subject incident. If you have a case where the mechanism of injury is unknown or in dispute, contact our biomechanical engineering experts.